ISSUES RAISED IN SECOND FURTHER NOTICE

Issue 19a (p. 74)[15]

> **If we adopt optional rather than mandatory X-Factors, could we use relaxed regulatory relief to encourage price cap LECs to elect the X-Factor most appropriate for their circumstances? If so, what types of relief would most reasonably or most effectively encourage LECs to select an appropriate X-Factor? How is this issue related to the issues above regarding relaxed regulatory treatment within the price cap plan and the triggers that might warrant each grant of relief?**

Response/Comments

The adoption of two X-Factors based on a properly applied TFP methodology is recommended. Under this optional X-Factor regulatory framework, LECs that choose the more challenging, higher X-Factor would not be subject to any sharing requirements. According to the economic theory of regulation, borne out by the performances of the LECs since the introduction of price cap regulation, LECs will be encouraged to select the X-Factor that leads to the greatest profit, given what the LECs know about their prospects for productivity improvement.[16] LECs choosing the lower X-Factor should be restricted by stringent sharing obligations to discourage false signaling, i.e. choosing a lower X-Factor when their prospects for productivity improvement are in fact higher, and enjoying the higher profits that result. This incentive lies at the core of the principles of incentive regulation. The higher X-Factor, in effect, confers regulatory relief -- the LECs choosing the higher X-Factor are exempt from the sharing obligation.

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[15] Issue and page number references in this Section are to the Second Further Notice in this proceeding.

[16] Laffont and Tirole (1993).

To eliminate sharing altogether would eliminate the single element of incentive regulation that encourages the LECs to reveal their true prospects, and would confer on the LECs the incentive to understate their economic prospects, as under conventional rate-of-return regulation. The two X-Factor approach, with sharing at the lower option, thus serves two purposes. It is an incentive for each LEC to select the X-Factor that is most appropriate for its circumstances, and it encourages the less efficient LEC to strive for productivity improvements which would eventually lead it to elect the more challenging X-Factor with its associated relief from a sharing obligation.

Under these conditions, it is clear why the LECs should not be permitted to change their selections of X-Factors during the triennial period that the X-Factor is effective. If a LEC were permitted to change its X-Factor election each year, it could adjust its spending so as to realize higher costs in a period ruled by a lower X-Factor and then elect a higher X-Factor so as to earn unshared profits based on its earlier investments and restructuring changes. Changing the X-Factor in mid-course amounts to repealing the LECs' incentive to reveal their true prospects for cost savings.

Issue 19b (p. 74)

> **If we adopt mandatory X-Factors, should we include considerations based on competitive circumstances in our assignment of an X-Factor to each LEC? Should the higher X-Factors be assigned to LECs facing less competition or more competition? What methods of measuring the extent of competition would be appropriate for this purpose?**

Response/Comments

As noted above, it is recommended that the Commission should not adopt a mandatory X-Factor regime whereby each LEC is assigned an X-Factor. The Commission's criterion that the LEC price cap plan be administratively "simple" would be contravened if X-Factors were so assigned.

It is premature at this time for the Commission to consider any regulatory relief based on competition in the local markets, while they are so completely controlled by the LECs. When the *fact* of competition in local markets is established, and its presence and effects are verifiable and measurable, then it would be appropriate to consider such options. The mere *prospect* of competition based on incompletely specified conditions, especially when the LECs have the option of erecting barriers to their competitors' access to the local loops, does not justify opening the other already-competitive markets to the LECs.

Also, please refer to the response to Issue 19a above.

Issue 19c (p. 74)

> If we assign X-Factors to each LEC based on competitive criteria, would it be reasonable to establish different X-Factors for more competitive areas in the LECs' service region?

Response/Comments

Please refer to the responses to Issues 19a and 19b above.

Issue 20a (p. 77)

> Is NYNEX's proposal [previously described in Second Further Notice] a reasonable one? Should we adopt it in some modified way? For example, if we were to retain sharing, should we adjust the specific sharing bands, change the number of levels of regulation, or include or exclude certain criteria from NYNEX's checklists?

Response/Comments

The NYNEX proposal is blatantly self-serving. It proposes to exchange the prospect of competition in its local market for its competitive entry into the long-distance market, even when it can effectively subsidize its long-distance service with shared assets and profits from its regulated local business. Elimination of sharing requirements in this case would simply encourage this type of exploitation. It would reduce downward pressure on local rates in areas where limited competition exists (e.g. the New York City area), and open the way to rate increases where competition does not exist (e.g. upstate New York). If the LECs expect to raise their earnings to a level that could trigger sharing by means of productivity improvements and growth in the local market, then they should have no difficulty accepting a higher X-Factor for interstate access in exchange for the elimination of sharing.

The circumstances that warrant a relaxation of sharing requirements would be, as at present, the selection by the LEC of an X-Factor which appropriately reflects the LEC's productivity. The LEC would then be free to adjust its prices as it sees fit within the established basket and band parameters and, at the same time, retain the profits from its productivity improvements.

Issue 20b (p. 77)

> Under what circumstances could competition be used to replace the "flow through" function of sharing? What incentives and disincentives are created by linking sharing and competition? Is it logical to establish wider sharing ranges as intermediate steps to the elimination of sharing? If so, how would such steps be reconciled with our policy of encouraging price cap companies to increase their productivity? If it is reasonable to link competition and the elimination of sharing, are other measures of competition more appropriate than those suggested by NYNEX?

Response/Comments

Competition in the local markets, when it actually emerges, will serve as a constraint on LEC pricing and thus on earnings. Where competition actually exists, relaxation of sharing will have no practical benefit for the LECs. The logical inference from NYNEX's proposal is that NYNEX believes it will be able to gain such relaxation even where it still has the power to raise prices, and that it will be able to use any additional flexibility to raise prices in less competitive zones, as noted in the response to Issue 20a above.

Competition, particularly in limited areas such as "density zones", is an inappropriate standard upon which to determine the relaxation of sharing rules. To the extent that the

LECs wish to retain earnings generated by productivity improvements, they should have no problem exchanging a higher X-Factor for the elimination of sharing.

Once again, as previously noted, potential competition -- as opposed to actual competition signaled e.g. by a market share well below 100 percent measured by revenues -- may have very little effect on pricing behavior of the LECs. (See also response to Issue 5a above).

APPENDIX C

Biographical Data

Dr. John Randolph Norsworthy

John R. Norsworthy is Professor of Economics and Management at Rensselaer Polytechnic Institute, Troy, N.Y. At Rensselaer, he was director of its doctoral program in Managerial Economics, jointly offered by the Department of Economics and the School of Management, and director of the Laboratory for Productivity and Technology in its Center for Science and Technology Policy.

From 1971 to 1985, Dr. Norsworthy served with the federal government as Chief of the Applied Economics Division in the Office of Emergency Preparedness (1971-73); Chief of the Productivity Research Division of the Bureau of Labor Statistics (1973-82), where he introduced total factor productivity measurement into official productivity statistics; and Chief of the Center for Economic Studies at the Bureau of the Census (1982-85).

His current research areas emphasize productivity, capital and finance issues. His current applied research projects include measurement and analysis of productivity, profitability, technological change and obsolescence in telecommunications, electric power generation, and banking; the comparison of effects of international tax environments on technological change; and incorporation of technological progress and obsolescence into econometric models and depreciation methods for telecommunications, electric utilities, and other industries.

He received the BA with distinction and Ph.D. in economics from the University of Virginia. Subsequently, he was a post-doctoral fellow in Law and Economics at the University of Chicago. He is a member of Phi Beta Kappa and received the Distinguished Achievement Award for Research from the U.S. Labor Department in 1980, and the Lawrence Gordon Award for Graduate Teaching in Economics at Rensselaer in 1988, and was a Senior Research Fellow in the National Science Foundation/American Statistical Association program at the U.S. Bureau of the Census in 1990-91.

Dr. Norsworthy has published numerous articles in professional journals dealing with the subject of productivity. Among other scholarly works, he is senior author of **Empicical Analysis of Technological Change and Productivity: Applications in High Technology and Service Industries,** published in 1992, and co-author, **The Macroeconomic Environment of Business as Implicit Industrial Policy: Its Enterprise and Industry Effects,** a forthcoming fiscal and technology policy study.

Dr. Norsworthy's Curriculum Vitae is set forth on the following pages.

CURRICULUM VITAE
JOHN RANDOLPH NORSWORTHY

Office: Lally Management Center, Room 08
Rensselaer Polytechnic Institute
Troy, New York 12180

Present Position:

Professor of Economics and Management, Rensselaer Polytechnic Institute	1986-
Associate Director, Technology and Productivity Center for Science and Technology Policy	1992-

Past Positions:

Senior Research Fellow, National Science Foundation/American Statistical Association U.S. Bureau of the Census	1990-91
Consulting Economist	1985-86
Chief, Center for Economic Studies, U.S. Bureau of the Census, U.S. Department of Commerce	1982-85
Chief, Productivity Research Division, U.S. Bureau of Labor Statistics	1973-82
Chief, Applied Economics Division, Office of Emergency Preparedness, Executive Office of the President	1971-73
Assistant /Associate Professor of Economics, Temple University	1968-71
Assistant Professor of Economics, University of Illinois at Chicago	1966-68

Education:

B.A. with Distinction, University of Virginia	1961
Ph.D. in Economics, University of Virginia	1966
Post-Doctoral Fellow, Law and Economics, University of Chicago	1965-66

Undergraduate Honors:

Phi Eta Sigma (First Year Honor Society)
Phi Beta Kappa
Z Society Award in Economics
Duncan Clark Hyde Memorial Award, Economics

Graduate Honors:

NDEA Fellow, 1961-1962, 1963-1965
Omicron Delta Epsilon

Other Awards:

Distinguished Achievement in Research
U.S. Department of Labor, 1980
Lawrence R. Gordon Award for Graduate Teaching in
Economics, Rensselaer Polytechnic Institute, 1988
NSF/American Statistical Association Senior Research
Fellow at U.S. Census Bureau, 1990-91

Languages: English, French; some Spanish, German

Selected Publications (Books):

Empirical Measurement of Productivity and Technological Change: Applications in High Technology and Service Industries (with Show-Ling Jang), vol. 211, Contributions to Economic Analysis series, D.W. Jorgenson and J.-J. Laffont, ed. North-Holland, 1992.

Macroeconomic Policy as Implicit Industrial Policy (with Diana H. Tsai) Kluwer Academic Publishers, forthcoming, 1996.

Articles, Reviews in Journals, in Books:

"Industry Effects of Macroeconomic Policies and Events: Linking Industry and Macroeconometric Models" (1995 or 1996) with D. H. Tsai, forthcoming in *Journal of Policy Modeling*.

"Incentive Regulation in Telecommunications: Why States Don't Choose Price Caps" (with James C. MacDonald and Cécile W. Fu) Michael Crew, ed. **Incentive Regulation of Industry**, Kluwer Academic Publishers, 1994.

"Cost Function Estimation of Quality Change in Semiconductors" (with Show-Ling Jang) in Foss, M., Manser, M. and Tice, H. eds. **Price and Quality Change in Economic Statistics**, University of Chicago Press for the National Bureau of Economic Research, 1993.

"Productivity, Costs and Privatization in the U.S. Postal Service: Variations Among Regions," (with Show-Ling Jang and Wei-Ming Shi), in M. Crew and P. Kleindorfer, eds., **Competition and Innovation in Postal Services**, Kluwer Academic Publishers, 1991.

"Labor Disputes and Productivity in Japan and the U.S." (with Alice Lam and Craig A. Zabala), National Bureau of Economic Research, **Productivity in Japan and the United States**, Charles R. Hulten, ed. University of Chicago Press, 1991.

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"Worker Attitudes and the Cost of Production: Hypothesis Tests in an Equilibrium Model" (with Craig A. Zabala), **Economic Inquiry**, January 1990.

"Environmental Regulation and Productivity Growth" (with Robert Haveman), W. Rosskamp, ed. **Public Finance and the Performance of Enterprise**, Wayne State University Press, 1989.

"The Effect of Worker Attitudes on Productivity in Japanese and U.S. Manufacturing" (with Craig A. Zabala), **Industrial Innovation, Productivity, and Employment**, Pier S. Abetti, ed. 1987.

"Effects of Worker Attitude on Production Costs and the Value of Capital Input" (with Craig A. Zabala), **Economic Journal**, December 1985.

"Worker Attitude, Worker Behavior, and Productivity in the U.S. Automobile Industry, 1959-76" (with Craig A. Zabala), **Industrial and Labor Relations Review**, July 1985.

"Responding to the Productivity Crisis: A Plant Level Approach to Labor Policy" (with Craig A. Zabala), in William Baumol and Kenneth O. McLennan, eds., **Stimulation of U.S. Productivity Growth**, Oxford University Press, 1985.

"Recent Productivity Trends in Japan and the United States (with David H. Malmquist), in Baumol and McLennan, eds., **Stimulation of U.S. Productivity Growth**, Oxford University Press, 1985.

"Capital Input Measurement: Options and Inaccuracies," in **Measuring Productivity: Trends and Comparisons,** from the First International Productivity Symposium, Japan Productivity Center, UNIPUB, New York, 1984.

Articles, etc (cont'd):

"Growth Accounting and Productivity Measurement," **Review of Income and Wealth,** September 1984.

"Input Measurement and Productivity Growth in Japanese and U.S. Manufacturing (with David H. Malmquist), **American Economic Review**, December 1983.

"Energy Prices, Technical Change, and Productivity Growth," in Sam H. Schurr, Sidney Sonneblum and David O. Wood, eds., **Energy, Productivity and Economic Growth,** Oelgeschlagen, Gunn and Hain, 1983.

"A Note on Introducing a Measure of Worker Attitudes in Cost Function Estimation" (with Craig A. Zabala), **Economic Letters**, October 1982.

"Productivity Trends in the U.S. and Japan," in **Productivity in the American Economy, 1982**, Hearings Before the Subcommittee on Employment and Productivity of the Committee on Labor and Human Resources, United States Senate, 1982.

Output Measurement and Productivity Growth in the U.S. Automobile Industry (with Craig A. Zabala), Research Report, Japan Productivity Center, Tokyo, 1982.

"Capital Formation and the Growth of Labor Productivity," in **Capital Formation and Industrial Policy (Part I)**, Hearings Before the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, House of Representatives, 1981.

Review of New Developments in Productivity Measurement and Analysis, J. W. Kendrick and B. Vaccara, eds., in **Journal of Economic Literature**, March, 1981.

"Dynamic Models of Energy Substitution in U.S. Manufacturing" (with M. J. Harper), in E. Berndt and B. Field, eds., **Modeling and Measuring Natural Resource Substitution,** MIT, 1981.

"Capital, Energy and Productivity Research," in J. Hogan and A. Craig, eds., **Dimensions of Productivity Research**, American Productivity Center, 1981.

"The Role of Capital Formation in the Recent Productivity Growth Slowdown" (with M. J. Harper), in A. Dogramaci and N. Adam, eds., **Industry and Aggregate Level Productivity Analysis,** 1981.

"Perloff and Wachter on Labor Force Composition and Productivity," Federal Reserve Bank of Boston, **The Productivity Slowdown**, 1980.

Articles, etc (cont'd):

"The Computation of the Generalized Inverse" (with Kern O. Kymn), **Kyunpook Mathematical Journal**. Vol. 20, No. 2, 1980.

"Comment on J. W. Kendrick's Productivity Trends in the United States" (with Jerome A. Mark), in S. Maital and N. Meltz, eds., **Lagging Productivity Growth: Causes and Remedies**, 1980.

"Alternative Computing Formulas for the Generalized Inverse and Evaluation of Their Performances" (with Kern O. Kymn and Tatsuo Okamoto), **Economic Letters**, 1979.

"Productivity in the 1980's: Capital, Labor, and Energy" (with M. J. Harper), invited paper, **Proceedings of the Business and Economic Section of the American Statistical Association**, August 1979.

"The Slowdown in Productivity Growth: Analysis of Some Contributing Factors" (with M. J. Harper and K. Kunze), **Brookings Papers on Economic Activity**, Fall 1979.

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"Partitioning Time Series with Dummy Variable Regression Analysis" (with David F. Tierney), **Proceedings of the American Statistical Association**, 1972.

"An Analysis of Variance of Firm Goals, Behavior and Performance in the Construction Industry" (with James F. Niss), **Journal of Behavioral Economics**, 1972.

"Economic Aspects of Air Pollution Control" (with Azriel Teller), in **Government Organization for an Air Resource Management and Control System**, Fels Institute of Local and State Government, Philadelphia, October 1968.

"A Computer Simulation System for Economic Evaluation of Alternative Air Pollution Control Policies," **Proceedings of the IBM Scientific Computing Symposium on Water and Air Resource Management**, 1968.

Recent Research Reports:

Measurement of Productivity and Marginal Costs for Incentive Regulation of Telecommunication Services, with Show-Ling Jang, James C. MacDonald, Diana H. Tsai, Cecile W. Fu and Yi Jing. Report to the New York State Public Service Commission, Center for Science and Technology Policy, School of Management, Rensselaer Polytechnic Institute, 1993. (Currently being revised and augmented for publication as a research monograph.)

Dual Use of Technology in Aircraft and Aircraft Engine Manufacture, with Simona Sung, Show-Ling Jang, and Ivan Pitt. Report to the General Electric Foundation pursuant to grant. Center for Science and Technology Policy, School of Management, Rensselaer Polytechnic Institute, 1991. (Currently being revised and augmented for publication as a research monograph.)

Papers in Recent Conference Proceedings

"Technological Change in Aircraft: Is Airline Investment in Aircraft Driven by Demand or Technology?" (with Ivan Pitt). Proceedings of the International Trade and Finance Association, Marseilles, France 1991.

"The Role of Science and Technology Policy in Technological Change". Proceedings of the Conference of the American Optical Society, Rochester, NY 1991.

"Retirement of Stranded Investment in Electric Power Generation with Implications for Measuring the Capital Component of Long Run Avoided Cost" with Thomas G. Bourgeois), *Proceedings of the Ninth Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, Ohio 1994.

"Service Quality at Large Local Exchange Carriers: The Tradeoff with Efficiency" with James C. MacDonald, *Proceedings of the Ninth Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, Ohio 1994.

Government Reports (Nontrivial):

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Sensitivity Analysis of the RISK II Computer Model, NAHICUS 62 Application (with John R. Norton), National Resource Evaluation Center, 1962.

Selected Working Papers and Other Work in Progress:

"Term Structure of Interest Rates, Inflation and Exchange Rates", with Wolfgang Bessler

"Crowding Out Effects on Manufacturing Productivity", with Diana H. Tsai

"A Dynamic Model of Bank Production with Adjustment Costs and Multiple Risk Effects", with Wolfgang Bessler

Selected Working Papers and Other Work in Progress (cont):

"The User Cost of Capital: Missing Links to the Theory of Finance"

"Empirical Measures of Performance for Regulation of Telecommunications", with Diana H. Tsai

"Interest Rates, Exchange Rates, and Domestic Prices: A Comparison of the Term Structure of Interest Rates in Germany and the U.S." with Wolfgang Bessler

"A Dynamic Model of Production Based on Internal Adjustment Costs" with Diana H. Tsai

"Why Value-Added Output Measures Bias Productivity and R&D Studies" with Simona Sung

"Regulation, Productivity and Technological Change in Airlines", with Ivan L. Pitt (book length manuscript)

"Technology Adoption in Domestic and Foreign-Related Manufacturing Plants in the U.S.", with Show Ling Jang

Recent Presentations: Until quite recently, I have not tracked presentations cumulatively. At least ten occurred in CY 1994 and four to date in 1995. Recent presentations in addition to those at the National Regulatory Research Institute (see Conference Proceedings above) include the following:

"Data Construction to Compare the Structure of Production in Canadian and U.S Manufacturing Industries" with Catherine J. Morrison and Diana H. Tsai, Canadian Economics Association, Montreal, Canada, June 2-4, 1995.

"The Influence of the Macroeconomic Environment on the Decisions of Enterprise: An International Comparison" with Diana H. Tsai, Canadian Economics Association, Montreal, Canada, June 2-4, 1995.

"Cointegration of German and U.S. Interest Rates", with Wolfgang Bessler, Conference of the Eastern Finance Association, Hilton Head, South Carolina, April 22-25, 1995.

"Managed Trade and Generic Industrial Policy", International Conference of the Atlantic Economic Society, Vienna, Austria, March 11-16, 1995.

"The User Cost of Capital in the Enterprise: Effects of Financial Capital and the Debt/Equity Distinction", International Conference of the Atlantic Economic Society, Vienna, Austria, March 11-16, 1995.

Recent Presentations (cont):

"Effects of Macroeconomic Policies on the Enterprise: A Study of Tax Rates and Incentives", International Conference of the Atlantic Economic Society, Vienna, Austria, March 11-16, 1995.

"Cointegration of Interest Rates in Germany and the United States: Effects of Inflation and Exchange Rates" with Wolfgang Bessler, Allied Social Science Association meetings, January 7-9, 1995

"Performance Measurement for Incentive Regulation in Telecommunications", with Diana Tsai, presented at the Georgia Productivity Workshop, University of Georgia, Athens, Oct. 20-23, 1994, Athens Georgia.

"Bank Production Modeling with Adjustment Costs and Risk", with Wolfgang Bessler, presented at the conference of The Institute of Management Science/Operations Society of America, Boston, April 22-25, 1994

"Shadow Costs of Capital Input as a Measure of Crowding Out" with Diana H. Tsai, presented at the conference of the Atlantic Economic Society, Montreal, Canada, October 6-9, 1994.

"Adjustment Costs in a Short Run/Long Run Model of Production: A Dynamic Model of U.S. Manufacturing", with Diana H. Tsai, presented at the conference of the Canadian Economics Association, Calgary, Alberta, June 10-13, 1994.

"A Dynamic Model of Bank Production with Adjustment Costs and Multiple Risk Effects", with Wolfgang Bessler, presented at the conference of the Canadian Economics Association, Calgary, Alberta, June 10-13, 1994.

"Crowding Out Effects in Manufacturing Industries: Microeconomic Evidence for a Macroeconomic Phenomenon" with Diana H. Tsai, presented at the conference of the Canadian Economics Association, Calgary, Alberta, June 10-13, 1994.

"Modeling Adjustment Costs in Banking" with Wolfgang Bessler, Research Seminar, Office of Thrift Supervision, U.S. Department of the Treasury, May 19, 1994.

Presentations in Europe and Asia. In the last several years I have given invited discussions of research methods and findings at the Wissenschaft Zentrum in Berlin; OECD Economic Statistics Office in Paris; Keio University, the Asia Productivity Center, and the Japan Productivity Center in Tokyo; National Taiwan University, National Chung Cheng University, National Sun Yat-Sen University and the Economic Development Council in Taiwan. I have also presented invited papers in conferences in Austria, France, the U.K. and the Netherlands.

Other Activities:

Brookings Panel on Economic Activity, 1979.
Conference on Research in Income and Wealth - Executive Committee, 1981-85.
Organizer for various conferences and conference sessions

Reviewer:

American Economic Review
Cambridge Economic Journal
Canadian Economic Journal
Harvard University Press
Industrial and Labor Relations Review
International Economic Review
Journal of Business and Economic Statistics
Journal of Economic Literature
Journal of Human Resources
Journal of Industrial Economics
Journal of Political Economy
Journal of Productivity Analysis
Johns Hopkins University Press
M.I.T. Press
Monthly Labor Review
National Science Founndation
Oxford University Press
Princeton University Press
Richard D. Irwin Publishing Co.
Review of Economics and Statistics
South-Western Publishing Co.
University of Chicago Press

(Nontrivial) Service Positions at Rensselaer:

Director, Doctoral Program in Managerial Economics	1987-93
Director, Center for Science and Technology Policy, School of Management, Rensselaer Polytechnic Institute	1990-92
Institute-Wide Promotion and Tenure Committee	1989-91, 1994-97
Institute-Wide Honors Committee	1989-91

Directories:

Who's Who in America
Who's Who in the World
Who's Who in the East
Who's Who in Finance and Industry
Who's Who in Science and Engineering

APPENDIX D

References to Responses and Discussions Related to Issues Requested for Comment

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